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PRACTICAL OBSERVATIONS ON, AND THE TREATMENT OF DIPHTHERIA, WITH ILLUSTRATIVE CASES.

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It is not our purpose, at this time, to attempt an essay—historical or therapeutical—on Diphtheria; or a synopsis, even, of the multitude of facts, collected with much industry by many observers. At this late day, such a labor—following the ample descriptions of Bretonneau and Greenhow, the recent lectures of Trousseau and Clark, and the many articles in the current medical literature—would be not only uncalled for, but, most decidedly, devoid of any practical utility. We aim at a much humbler task—simply the recording of our own observations, together with the details of cases, and the various modes of treatment adopted; whence we have arrived at conclusions somewhat at variance with those generally entertained by the great body of medical writers.

It may, perhaps, be proper to state, that our opportunities for studying this disease have been ample; since, in addition to those presented in private practice, we have enjoyed the extended field afforded by the Out-Door Department of the Long Island College Hospital, where from 15 to 35 patients are treated daily. In this institution my colleagues, as well as myself, made trial of the many medicinal agents that are extolled by writers as possessing a decided and marked power over this alarming disease; yet, notwithstanding the care with which the patients were watched, our success was so unsatisfactory as to render us sceptical of the value of drugs in cases of any severity. These, with an equal, steady step, advanced to a fatal issue, unchecked by the means at our disposal, if not hastened in their downward march by abortive efforts to subdue the local inflammation and remove the membranous exudation. At length, through a lesson learned at the bed-side, as will appear in

* The following article, excepting the recent cases and certain additions under the head of treatment, was written a year ago, when diphtheria was generally treated as a local phlegmasia. Insensibly, a tonic, sustaining course has taken the place of antiphlogistics; and it is to be hoped that free stimulation will soon be the general practice.

the sequel, a doubt of the principles by which hitherto I had been guided took possession of my mind, and led me to adopt a different plan of treatment.

It requires a certain boldness to question long-cherished opinions, with which our minds have become indoctrinated, and, thenceforth, carry our investigations beyond the narrow circle that has hitherto bounded our mental horizon. We hold certain doctrines in regard to fever and inflammation, and, also, in regard to the remedies best calculated to reduce vascular action, and prevent or remove one of its results—an exudation of plastic lymph—so incorporated with what we know of disease as to give a coloring—a bias—to all we see or learn at the bedside. These doctrines ceased, long since, to be debatable; in fact, have assumed the important position of principles and axioms in medicine. It appears absurd and irrational to ply a patient with brandy who has a high fever, hot skin, rapid pulse, &c., and whose throat is closed from an acute inflammation and covered with a fibrinous exudation—unerring symptoms of high action. Reason—the *only guide in a sound medical practice*—points out two very plain and evident indications to be fulfilled; to wit, subdue the fever, and remove the inflammation with its attendant exudation. Hence two plans of treatment—the general and local—are in favor, and are enforced either singly or united: the one is carried out by antiphlogistics, such as purgatives, leeches, mercurials, &c., or by certain supposed specifics, as the chlorate of potash, for example; and the other by a variety of astringent and caustic applications, the chief of which are alum, nitrate of silver and nitric acid. As will appear hereafter, from the record of our cases, we became so impressed with the powerlessness of these means to withstand the onward march of the disease, that we determined, by a bold and sudden change, to discard these systems of medication, and commence the free, liberal use of stimulants at the outset of the disease, however high the fever, or swollen and inflamed the tonsils. With some hesitation and many misgivings, I made the first trial, supported by the reflection that this new course, however preposterous it might appear, could not increase the hazard surrounding the patient, or redound more to my mortification. Notwithstanding the fact that a homœopathic physician in our neighborhood *laughs* at Diphtheria, and the still harder fact that the science of numbers—skilfully handled—gives us an encouraging report of cases, with but a trivial mortality; still, I am certain that in this place, at least, more than one fourth of those attacked have died; and that, of the malignant cases, the great majority have ended fatally. The experience of our physicians who discriminate their cases and are careful and trustworthy in their diagnosis, confirms this assertion. Any greater success has been due to the avoiding of lowering, antiphlogistic remedies, and the adoption of a plan more or less invigorating and supporting. Formerly, I entertained as great a dread of

Diphtheria as of Asiatic cholera; but, since the adoption of a stimulating treatment, I have gradually acquired a renewed confidence in remedies—a confidence so great, that I give place to the hope that this course of medication, when generally followed, will rob this frightful disease of much of its terror. This hope is greatly strengthened by the encouraging reports of my late colleagues, Drs. Clark and Davol, which confirm my observations. You may resort to quinine and brandy in stimulating doses, at the outset of this disorder, with something of the assurance and reliance that you meet an intermittent disease; and, according to my experience, a malignant miasmatic fever is no more amenable to the power of cinchona, than an equally malignant diphtheritic state of the blood is to that of stimulants. In both diseases we must strike boldly and promptly, if we hope for success. Every moment is valuable, and the hour for active interference is passed, when sinking and prostration announce the constitutional powers tottering and subdued; since we well know that the power of medicine is relative, not positive—indirect, not inherent—and merely acts by calling out the reserved forces of the system. In all diseases we cannot too closely watch the workings of the great vital organs, nor too carefully note the condition of the ganglionic nerve-centres, or that of digestion, assimilation and nutrition; for by the harmony and perfection of each part in its sphere is accomplished that mysterious phenomenon which is called life. This vitality—a condition common to everything living—exalts the recipients above the laws of matter, and places them in opposition to the laws of chemistry and the thousand other physical forces that tend to their destruction. When this vitality, or the power which upholds living organisms, is subdued, and our bodies are rapidly succumbing to chemical and physical disintegration, as shown by a *dissolved state of the blood*—so termed, not inappropriately, by the old writers—there is nothing left to respond to our remedies.

Within the last few years the careful trial of different modes of treatment, whether rational or no, has done much to enlighten us as to the pathology of a number of diseases hitherto, and even now, too often treated with lowering remedies. For example, in phthisis, where there is a local inflammation around tubercular matter, the formation of pus, ulceration, &c.; bleeding, leeches, blisters, antimony, iodine, confinement and low diet have given place to nutrients, stimulants, air and exercise, to the great gain of humanity. In scrofula, in its hydra-headed forms, though the patient may have all the appearances of robust health—be even full-blooded and well developed—we have at last discovered that inflammation is not to be met by the usual means, which we enforce with such signal success in constitutions untainted by this vice. The inflamed eyes peculiar to such subjects will, however high the local excitement or fever, be rendered worse by depletion, antiphlogistics and mercurials, and

often show prompt amendment under the use of animal food, wine, quinine, &c. This is true of all the diseases pertaining to the scrofulous diathesis. They do not originate from external causes, but owe their rise and continuance to a defect in the vital organs. Hence it is that local applications can be of no avail while the fountain is poisoned; but when the blood, nervous centres and each organ are brought up to the normal standard, and the vital elaborations are made to go on harmoniously, diseases will disappear, or, if they linger locally, will now be benefited by appropriate applications. It is inconceivable, the amount of harm that has resulted from lowering remedies in scrofulous patients; and, even at the present time, through a bias from a life-long struggle to subdue fever and inflammation, many of our professional brethren are loth to forsake old, established opinions, or to confess that facts are more valuable and trustworthy than reason. What but the slow, tedious schooling of facts, taught us, long since, in cancer, malignant pustule, gangrene, sloughing ulceration, phagedæna, and the like, that the part affected is not more at fault than the entire system—is merely the site of a constitutional vice—and that these diseases are not to be subdued by the remedies for inflammation, or eradicated by caustics or the knife?

In variola, rubeola and scarlatina, the hope is no longer entertained of cutting them short by active interference, or of modifying, materially, their stages; but, on the contrary, we now patiently trust to the natural powers, whilst these are competent to the task; and only lend assistance when they give way, or show signs of an inability to withstand or eliminate the *materies morbi*.

In typhus and typhoid fevers, and, in fact, all others of a low type, experience has taught us that a reducing plan of treatment is not to be relied upon; that we must anticipate the coming debility by a supporting regimen and medication, regardless of the febrile excitement, congestions, &c., or at the most view them as of secondary importance; and fortify the vital powers for the final struggle, when the circulation becomes poisoned and the nervous system prostrated.

In this class of diseases our attention should not be occupied with the complications and symptomatic manifestations; but, rather, we should strive to reach the heart of the matter—the real disease—which, when removed, will carry in its train its various attendants and accessories.

Rheumatism is another notable example of a disease illustrating the principles of practice advocated above. Bleeding, calomel, purgatives, blisters, &c., long battled with the fugitive enemy with ill success. At length, by experiment, it was discovered that alkalies, by neutralizing the acid element in the blood, remove, so to speak, the very food that sustains and keeps alive the disorder.

There cannot be a reasonable doubt that Diphtheria belongs to this class of blood-diseases. Ostensibly it is an ailment of the throat,

attended with inflammation and the effusion from the capillaries of coagulable lymph. So, also, rheumatism presents the appearance of an inflammation of the ligamentous structures; scrofula, of the glands, bones, &c.; syphilis, of the skin, mucous membrane and periosteum; and variola, rubeola and scarlatina, of the skin alone, whence they have been improperly classed under the head of cutaneous diseases.

The pathology of Diphtheria is not elucidated by autopsies, nor by chemical or microscopical examinations. No special structures are invaded, or characteristic lesions discovered; only everywhere is found a dark, grumous blood, filling equally the veins and arteries, and stagnated in various organs. MM. Millard and Peter first pointed out that the blood was of a dirty brown color, resembling liquorice juice or water containing a mixture of soot.

During life there are conclusive proofs, in the malignant cases, of a poisoned, disorganized condition of the circulating fluid—the dark, grumous blood oozing from the tonsils when roughly touched, the spontaneous hæmorrhages, the muscular weakness, the prostrated nerve-power, the clammy sweats, the rapid, soft and shaky pulse, the sphacelation in the fauces, the sequelæ—anæmia, paralysis, &c.—the gradual sinking of the patient, and the extinction of life without an effort at reaction, or the slightest tokens of constitutional resistance. The evidences of a blood-contamination, equal to those seen in typhus, are infinitely greater than those presented in other diseases now universally conceded to arise from this cause. Chemistry detects no material poison in the air during a diphtheritic epidemic, nor any foreign element in the blood, or any change in its constituents, where patients have died of this disease. The changes, and the agencies producing them, whatever they may be, are inappreciable by this means of investigation.

The enlarged vision afforded by the microscope likewise reveals no sensible alteration in the blood; and the naked eye, which recognizes the fact of the transudation of the liquor sanguinis, and its concretion into a pseudo-membrane, gives us equal information with the most powerful glasses. The fibrillæ, granules, pus-cells, &c., that are found, are not distinctive; and the much talked of algæ are frequently seen on mucous surfaces when covered by morbid secretions. Their ova exist in the atmosphere at all times, but are not developed unless a favorable nidus is presented.

From these purely scientific investigations, so rude in comparison with the finer operations taking place in living organisms, we, in this instance, can gain no light, and are obliged, perforce, to learn the true nature of Diphtheria by actual observation in the trial of various modes of treatment. If the free use of stimulants, in the beginning and height of the disorder, subdues the fever, removes the inflammation, causes the membrane to fall, prevents relapses, and, in a word, accomplishes a cure at once rapid and permanent

in almost every case where the treatment is commenced early, we must be forced to the conclusion that Diphtheria is a disease of low action—atonic—and that the inflammation attending it is certainly not idiopathic and active. This is further shown by the greater success following this mode of treatment than any other; and by the significant fact, that malignant cases thus usually escape the *dissolved* state of the blood, and paralytic accidents are, by the same medication, easily remediable.

The cause of Diphtheria is an interesting theme for speculation. There need not be a material agency—a septic poison in the atmosphere—as is the general opinion; which, received into the blood, multiplies itself, like a ferment, and thus contaminates the entire circulating mass; since a change in the normal constituents of the air, or a variation in its electric condition, might render it less adapted to fulfil its part in the transformations constantly going on in the lungs, whence would arise a defect in the vital elaborations of the blood. A faulty state of the atmosphere—one that imperfectly supplied the blood with the influence necessary to its constant renewal—would be scarcely felt by the strong and robust, but would tell with the most effect on the debilitated or those of little vital power. In our experience, the subjects of Diphtheria are, almost universally, children; and when it attacks adults, those of little stamina are singled out, who at the time are suffering from unusual exhaustion. Of the former, those inheriting a scrofulous constitution, or any other vicious state of the system, are the ones, as a rule, that are seized. The child has not only to maintain the body *in statu quo*, like the adult, by the constant renewal of the worn-out materials, but also to provide for growth and increase. Hence children inheriting any depravity of the constitution are always pale, debilitated and sickly, and prone to disease; though, should they survive to mature years, they frequently become strong and robust.

That an inappreciable relationship of the atmosphere may render it less fitted to effect the constant changes and renewals of the blood that take place in the air vesicles, and less adapted to elaborate and vitalize it, particularly where there is a defect in the powers of the individual, is more apparent when we recollect that the circulation is the medium for the ingress and egress of all the new and effete materials of nutrition; that constant changes are here going on, affected by living structures; that the blood circulating in its vessels is organized equally with the solids; that in both solids and fluids, by the agency of cells, absorption, assimilation and nutrition are effected. A dissimilarity between the solids and fluids is apparent, not real. The blood-globules or cells are not fixed in one locality, like the cells in the tissues, but are designed, from their office, to float in their nutritive plasma. Hence any noxious material in the blood, or any impediment to its vital transformations, will, equally with changes in solid structures, engender disease. That

the cause of Diphtheria is not an animal or vegetable poison, but a state of the air that impairs the vital status of the blood, is further shown by the following considerations. Diphtheria prevails in all seasons and climates, equally in primitive or miasmatic regions, equally in well-cleaned streets, among the better classes, or in courts and alleys among the victims of want and vice; indeed, filth, poverty, vegetable and animal effluvia, do not increase its virulence or cause its dissemination. It is not self-limited, has no fixed stages of increment and decline, may recur several times, does not attack indiscriminately, but, as a rule, singles out scrofulous children, or at least individuals whose constitutions are reduced and blood impoverished; and, more than all, Diphtheria is not inoculable. M. Trousseau introduced the exudation into his arm and tonsils; and M. Peter inserted it into his lips, rubbed it over his fauces and had it coughed into his eye, without any bad result. In fine, we have no evidence that Diphtheria is contagious, or in any way passes from one individual to another. My observation teaches me that, though more than one of a family may be attacked simultaneously, or within a few days of each other, the disease is not communicated to visitors, or to other families in the house. It might be expected that, of a number of children of like organization and habits, breathing the same air and eating at the same table—or, in other words, having identical susceptibilities and similar surroundings—more than one would be attacked at or about the same time. Generally, however, cases of Diphtheria occur here and there in distant localities; whereas, had contagion any influence in the matter, the disease would not be thus limited, or its victims far separated. Diphtheria has undoubtedly occurred at all periods, and in all countries of the world; but from the low intensity of the causation, the disease, except in epidemic seasons, has been confined to isolated cases. Aside from croup, that may owe this origin, many cases of scarlet fever have ended fatally on the appearance of the diphtheritic exudation. With these preliminary observations, I will now give the details of the most interesting cases that have fallen under my notice.

CASE I.—Some ten years since I saw a case of scarlet fever of a mild type, which, after the disappearance of the eruption, was attended with an exudation on the mucous surfaces of the fauces and nostrils, presenting the appearance of the diphtheritic membrane. Alum, borax and the nitrate of silver were assiduously applied for several days, without any good result, when they were discontinued, and the case trusted to nutrients and wine-why. The indications for the change were apparent from the rapidity and softness of the pulse, the profuse perspiration, the blanched countenance and great debility. Recovery eventually took place, though the exudation lasted more than three weeks from its first appearance.

CASE II.—About seven years since, a case of scarlet fever in a child was progressing favorably, near the decline of the eruption, when, suddenly, a croupy cough set in at night. On the next morning, a well-defined and characteristic membrane could be seen in the lower posterior part of the pharynx. An emetic was given, and the nitrate of silver applied, but without any favorable change. Inspiration became more and more difficult and distressing, until the case terminated in death, on the second night, by apnœa.

CASE III.—Sixteen years since I lost a child eighteen months of age, with what appeared to be a membranous inflammation of the bronchial tubes. The cough was muffled, not ringing, the fever high, and the respiration, from the first frequent, became more rapid and distressing until death took place, in twenty-four hours from the onset of the disease. At the *post-mortem* examination, which was made by Dr. Atwater, it was found that the air-vesicles were filled, and the bronchial tubes and trachea lined, with a false membrane. From this membrane not affecting the larynx, and from its being thicker in the smallest tubes and thinner in the larger ones, so much so that it became a mere film in the upper part of the trachea, it was evident that the disease began in the mucous tissue of the lungs, if not in the air vesicles themselves.

CASE IV.—In the second year following, another child, nine months of age, was attacked with the same symptoms, lived the same length of time, and died in the same way. Dr. McClellan, who had seen the child several times during its illness, made the autopsy. No membrane was found, or other disease of the larynx, trachea, bronchial tubes, lungs or heart to account for the oppressed respiration or for the fatal issue. My conclusion, from what I have since seen of Diphtheria, is that both children had this disease; in one the exudation was effused, in the other death took place from the state of the blood.

CASE V.—Nearly three years since I was called to a boy five years of age, who had complained of a sore throat for a week, and had had a croupy cough for forty-eight hours. His condition now was most alarming, if not well nigh hopeless: a membrane, readily seen in the throat when the tongue was strongly depressed; a pulse uncertain, running and scarcely to be counted; the surface of the body blue, and covered with a profuse, clammy perspiration; and a difficulty of respiration, which, impossible in the recumbent posture, could only be accomplished when the head and shoulders were elevated, through the aid of the voluntary muscles. Internally, senega and squills, in emetic doses, were given, and then continued in quantities short of nausea, combined with the carbonate of ammonia. The nitrate of silver— $\frac{3}{4}$ i. to $\frac{3}{4}$ i. of water—was passed into the larynx, twice the first, and once the two following days; and a blister applied over the sternum.

During the first two days, several small shreds of membrane came up on the swab, and in the matters vomited. The croupy symptoms disappeared promptly; but the recovery was slow, both owing to a bronchitis that followed, and a profuse and continuous discharge from the blister. Its surface was at no time covered with a membrane, but with weak, indolent granulations, that, in spite of burnt alum and the sulphate of copper, showed no disposition to cicatrize. It was more than a month before the blister healed—a fact readily accounted for by the anæmic, feeble state of the patient. This condition was eventually removed by nourishment and tonics.

Following this case, many others were presented to my notice, mostly, however, in the Out-Door Department of the Long Island College Hospital. These, by my colleagues and myself, were treated in a variety of ways. We gave a fair trial to mercurials, in small continuous doses, and in larger ones united with purgatives; to low diet and full diet; to diaphoretics, such as nitre and the acetate of ammonia; to the chlorate of potassa, internally and as a gargle; to fomentations and poultices external to the throat, both simple and medicated; to astringent collutoria, alum and zinc for example; to caustic applications of iodine and the nitrate of silver, &c. &c. None of these various means appeared to have a controlling power over the disease. Some of the cases, seemingly cured, returned in a few days with the membrane re-formed; and many were attended for a length of time, without any change either for the better or worse. The mortality cannot be stated, since the patients were not followed to their homes; and, if severe symptoms set in, most likely the nearest physician was called. At this period the epidemic was of a less malignant character than for the last twenty months, as was shown by a lack of a disposition to spontaneous hæmorrhages.

CASE VI.—About the time above mentioned, through the kindness of Dr. Mason, one of the Council of the College, an opportunity was afforded me of seeing a case in which the chlorate of potash was used in conjunction with nutrients and wine whey. Prof. Flint also saw the case several times, in consultation. There was hæmorrhage, several times, from the nose; a rapid, irritable pulse; a clammy perspiration and great nervous and muscular prostration. The child lived for more than a week, but eventually died from the poison of the disease, without the larynx becoming implicated. Dr. Mason informs me that the two remaining children took the disease—one severely—but recovered by a treatment similar, though somewhat more stimulating.

CASE VII.—I was called, Dec. 16th, 1860, to see a little girl 5½ years of age, of a scrofulous constitution, who had been much confined in hot, close rooms. She, for the last five days, had complained of a slight stiffness and soreness of the throat, and was languid and listless—symptoms that were supposed by the parents to arise

from *a cold*. Both tonsils were swollen and dotted with several little circumscribed white points, apparently the mouths of the mucous follicles. The child was feverish, petulant and nervous; the pulse was soft and rapid, and the passages were dark-colored and fœtid. I directed *R.* Hydrarg. submur., gr. i.; cretæ ppt., gr. viij. *M.* Fiant cht. No. viij. *S.* One every second hour until used, and then followed by a dose of castor oil.

Dec. 17th.—The fauces were more inflamed, of a deeper color, and partially covered by the coalescing white points above mentioned. The discharges from the bowels are of the same character as at first, and now hæmorrhage from the nose has shown itself. I repeated the powders and oil, applied lunar caustic— ζ i. to ζ i. of water—to the throat internally, and ordered an anodyne liniment of camphor, laudanum and arnica externally.

18th.—The caustic was applied morning and evening, and a diaphoretic of nitre, ipecac. and the acetate of ammonia given. From the contact of the swab a dark, grumous blood flowed from the tonsils. During the night the child had bleeding from the nose several times, was feverish and somewhat delirious.

19th.—As there was no improvement in the appearance of the passages, the powders were renewed and given alternately with the mixture. The caustic and anodyne liniment were continued. There is now less heat of skin and fever; a tendency, at times, to perspiration; increasing weakness; greater tumefaction of the tonsils, which bleed, however lightly touched. Not the slightest impression has been produced, by the caustic, on the exudation.

20th.—The symptoms are all aggravated, and restlessness and jactitation are commencing. I omitted the mercurial, continued the mixture adding camphor, re-applied the caustic and directed beef-tea.

21st.—The child's throat is filled with a bloody membranous matter of a very fœtid odor, and a suspicious, black-looking spot is observable on the uvula. The nose has bled several times in the last twenty-four hours. The child's vital power appears weighed down by a poison in her veins, and is rapidly yielding, as is becoming more evident day by day by the increased debility and prostration. Omitting other medicines, I now attempted to support the constitutional forces in the struggle, with nourishment, wine whey and quinine.

22d.—The child is in a state of semi-consciousness, sleepless, and tossing about constantly. The entire uvula has become of a black color. The same treatment continued.

23d.—The uvula was sphacelated, and the soft palate and tonsils looked dark colored, almost black. The child, in a state of constant jactitation, unconscious of those around her, sank rapidly, and died at 11, P.M., without the larynx becoming implicated.

A week after the death of this girl, her brother, two years of age,

the only remaining child, took the disease, which was attended with similar and equally malignant symptoms—spontaneous hæmorrhages, exhaustion and gangrene—and was followed by death in about the same time, without the membrane extending to the larynx. These particulars I learn from the physician who attended the case. The treatment was not stimulating or sustaining.

CASE VIII.—A few days after the death of this girl, I was called to see another about the same age, who was scrofulous, fleshy, a hearty eater and delicate from confinement within doors. The child had great irritability, a high fever, a hot, dry skin, and a rapid, full pulse. Great difficulty was experienced in swallowing, from the inflamed and swollen tonsils, on one of which a membranous patch was seen. A teaspoonful of brandy and a quarter of a grain of quinine were directed to be given every hour, and the nitrate of silver was applied every morning. This treatment was continued, uninterruptedly, for four days; when, on the disappearance of the membrane, the quinine and caustic were omitted and the brandy given singly. This was to prevent a relapse, in which it was successful, and to correct the altered state of the blood. On the morning of the second day of the disease the fever was lessened, the skin disposed to perspiration, and the swallowing was easier, though the membrane had extended and the tonsils were darker colored and bled when roughly touched.

On the third day there was a great improvement in the symptoms—diminished vascular excitement, the membrane stationary, looking thicker, more raised and of a yellowish color.

On the fifth day the engorgement of the tonsils had subsided, and the membrane had disappeared.

CASE IX.—Master F., aged 6 years, living in State St., one of the healthiest locations in the city, and allowed to exercise freely in the open air, took the Diphtheria, with symptoms nearly identical, as to fever, pulse, state of the tonsils and extent of the exudation, with those observed in the last case. The boy was scrofulous, but not sickly, and had had the scarlet fever. This case being trusted to brandy and quinine, the same diminution of the fever, subsidence of the swollen tonsils, and limitation to the extension of the membrane, were observed as in the last case. Recovery took place in five days. This boy, though remaining perfectly well during an interval of seven months, was attacked again in the latter part of September, and died from the poisoned state of his blood.

CASE X.—The lady of a physician was taken with the Diphtheria a year ago last March. She is constitutionally feeble and scrofulous, of a consumptive tendency, and never enjoys even tolerable health. A patch of exudation appeared on one tonsil, with slight redness but considerable irritation of the throat. There was no fever, and but little general disturbance, beyond what might be accounted for by the high nervous excitement at the dread of this terrible complaint.

For the first forty-eight hours the treatment consisted mainly of the nitrate of silver and tincture of iodine, which were applied energetically to the seat of the membrane. This would fall, but in a few hours be replaced. After the last cauterization the membrane, in three or four hours, spread to the posterior part of the pharynx. This result followed so rapidly as to render the sequence between cause and effect apparent to the doctor, and myself who now for the first time saw the case. We now determined on discontinuing all local medication except demulcents, and relying on brandy and quinine. Some twenty grains of quinine were given during the next twenty-four hours, which very speedily caused ringing in the ears. The brandy was taken in a small quantity, only one teaspoonful every third hour. The cure was most rapid and prompt. The membrane disappeared in three days, and no relapse has since occurred. Mrs. — for some time subsequently had great weakness of the lower extremities, almost a total inability to rise when sitting; evidently a partial paralytic condition. This in four or five weeks entirely disappeared. This lady had had the scarlet fever.

CASE XI.—Master C., aged 6 years, scrofulous, small in stature, and of defective vital power, was attacked with the most intense congestion and inflammation of the tonsils, and had a bounding, rapid pulse of 120 pulsations per minute, and a high fever. On the second day the symptoms were aggravated, especially the condition of the throat, which was now hard and swollen in the parotid region. The mucous follicles of the tonsils were distended with a white matter, giving them the appearance they present in follicular inflammation; which disease it was supposed to be and treated accordingly with diaphoretics, &c. On the third morning these white points had united, covering the tonsils uniformly. The entire fauces were more inflamed, had a darker hue, and were disposed to bleed on examination. There had been nose-bleed the previous night. The fever was high, the restlessness and irritability very great, and the pulse 150 per minute.

The boy was now put upon brandy and quinine; the former, at first, in teaspoonful doses every second hour, then every hour, but eventually every half hour; the latter in quantities of six grains in the twenty-four hours, the first three days, when, on the supervention of tinnitus aurium, the dose was lessened. A portion of quinine was given for five days, but after this period only stimulants and nourishment. At the outset, beef-tea was ordered; but, from the difficulty of swallowing, little was taken during the height of the disease. The parents were enjoined to be particular in administering the amount of stimulant directed, whatever else might be neglected. During a part of the treatment the patient took a weak solution of chlorate of potash, given more for the purpose of bathing the throat as it was swallowed, than from any reliance on its systemic effects.

The second day after commencing the use of brandy and quinine

there was the following condition: the fauces uniformly covered with membrane, the fever and heat of skin gone, the surface bathed with perspiration, and the pulse equally rapid as at first.

On the third day there was a profuse perspiration, an oozing of blood from the tonsils, epistaxis and greater evidences of prostration, as shown by restlessness and jactitation. Though the quantity of brandy now given was large, the effects of a stimulant were not observable. In the evening I gladly availed myself of the counsel of my colleague, Prof. Flint, both to gain the benefit of his large experience and to calm the excitement of the terror-stricken parents. The course hitherto pursued was approved of and continued. Subsequently we were both in attendance until the patient convalesced.

On the fourth day the membrane was detached at several points, was raised, thicker, yellowish, and appeared as though it would soon fall off. The inflammation had subsided so much that the act of swallowing was more easily effected; yet the pulse was still soft and rapid, the weakness extreme and the sweating profuse and exhaustive. ¶

From this date the improvement was rapid—the membrane hanging in shreds and finally dropping off, and the engorgement of the throat subsiding, so that the parts resumed their natural appearance.

On the ninth day the membrane disappeared and has not since returned. On account of the debility of the patient, the brandy was continued for some time after my attendance ceased. Under its use the child recovered from the debility so characteristic of this disease, and regained his wonted health.

CASE XII.—Mrs. H., Poplar St., 33 years of age, had been expectorating blood in large quantities for ten days. She was reduced to an extremely anæmic condition. In addition to the loss of blood, there was a dry cough, sibilant rhonchi all over the chest, and dullness on percussion at the top of the right lung. She had persisted in nursing a child, past two years of age, to the present time. Nursing was interdicted, and the following prescription directed, with beef-tea as nourishment. *R.* Sol. ferri persulphatis, 3 iss.; aq. fontanæ, 3 vi. *M.* S. Fifteen drops every fourth hour. The iron had a most favorable effect on the hæmorrhage, which, gradually abating, had nearly disappeared in three days; but the other lung-symptoms remained the same. At this time a diphtheritic patch showed itself on one tonsil, and, on the next morning, covered the entire fauces. The swelling and congestion were very great, both internally and externally, rendering deglutition nearly impossible. Discontinuing the iron, I directed quinine and whiskey—of the first one fourth of a grain, and of the latter a teaspoonful, every second hour. At first, the stimulant flushed her face; but, eventually, by a gradual increase, she took a dessert spoonful without any excitement. The quinine was lessened on the fourth day, and omitted on the

sixth, on account of the troublesome noises in her ears. No other medication, unless demulcent drinks of flax-seed tea be so considered, was employed. Swallowing was so painful that nourishment in any amount was not taken until the disease was on the decline. On the third day of the Diphtheria, the membrane, raised, yellowish and slightly detached at its margins, began to fall off, and on the sixth day the throat was free from it. Now, however, it had extended over the mouth, covering the tongue and inside of the cheeks. In ten days the disease disappeared from the mouth. There was now copious purulent expectoration, great debility and colliquative perspiration. The only treatment, excepting the quinine given the first five days, was free stimulation; yet the pseudo-membranous inflammation of the fauces and mouth, the inflammation of the bronchial tubes, and the congestion of the upper portion of the right lung, were successfully met and subdued by these means. Even the hæmorrhage, so prone to be aggravated by excitants, ceased, and did not return. Her convalescence and recovery, which were attended with no accident, were perfected by the same medication. This family, in which were four children, had, fourteen months previously, suffered the loss of a daughter with Diphtheria, at their present residence. The other children escaped the disease.

CASE XIII.—Mrs. M., Furman St., aged 35 years, the mother of four children, was taken with the Diphtheria, July 27th, two days before I was sent for. The fever was high, the skin alternately dry and perspiring, the pulse 120 per minute, and the throat much tumefied, externally and internally, with a bloody, membranous exudation, coating the fauces. She was ordered a teaspoonful of brandy and one fourth of a grain of quinine every one and a half hours, with flax-seed tea as a drink. On the second day the dose of brandy was doubled, and thus continued until convalescence; when it was lessened, but not omitted, while there was any remaining debility. The quinine was only administered the first three days. On the second day, the subsidence of the fever, irritability and congestion, was remarkable. The course of the disease was similar to that of the last case related. In six days the membrane disappeared, and was not renewed;—and the tonsils regained nearly their natural size; though the pulse was still over 100 per minute and the patient was extremely debilitated. By stimulation and nourishment she recovered her health in about a month.

A child that this woman was nursing, previously well excepting a slight peevishness from dentition, became violently affected with vomiting and purging on the second day of my attendance, and died from asthenia in seventy-two hours. No medication had the least effect. It might be a question whether the mother's milk was not the cause of this rapid and fatal sickness—and whether, notwithstanding the non-appearance of the membrane, the disease in reality was not Diphtheria.

CASE XIV.—Nine days after the mother's seizure, the eldest girl, 10 years of age, was attacked. She had similar symptoms as to fever, pulse, and tumefaction and inflammation of throat, but the exudation only covered one tonsil. She was put upon the same treatment, which attained equally gratifying results—a rapid subsidence of the fever and inflammation, and a removal of the exudation in five days. There was no relapse or other accident.

CASE XV.—Twelve days after the attack of the girl, a boy, 8 years old, sickened, apparently with the same disease, as he had similar symptoms. He was ordered the brandy and quinine mixture. On the second day, the surface of his body was uniformly covered with the eruption of scarlatina, of a bright natural hue. For twenty-four hours the stimulant was omitted, but on observing a membrane coating the fauces, it was resumed in a lessened proportion, and continued to the close, as in the other cases. The fever, high for three or four days, at night was attended with delirium. The exudation disappeared in eight days, but the boy was left extremely anæmic and semi-paralytic. Directly dropsy supervened, which continued for nineteen days. At the end of this time the defect of nerve-power, which first showed itself on the falling of the membrane, still continued, and was so great that the patient could barely maintain himself on his feet. Recovery was not complete before the end of the sixth week. The treatment consisted of animal food and stimulants, with the addition of diuretics, whilst the dropsical symptoms existed. The only remaining child had a mild attack of scarlet fever, but escaped the Diphtheria. The girl, previously affected with the Diphtheria, did not take the scarlet fever, though she never had had this latter disease. I should state, that the mother attributed her sickness to washing clothes at her sister's house, where a child, having a severe affection of the throat, died of scarlet fever.

CASE XVI.—An infant, 14 months of age, had scarlatina anginosa; and, when the eruption was on the decline, she became worse, apparently from the increased swelling and inflammation of the tonsils. There was a plastic exudation covering the fauces, great prostration and rapid sinking, followed by death in twelve hours. Had the diphtheritic tendency been detected at an earlier period, and stimulants administered, which now from the state of the throat was impossible, perhaps the result might have been more fortunate.

CASE XVII.—The elder brother of the boy who had the Diphtheria in February, and whose history is given in Case IX., was attacked with this disease, simultaneously with his aunt, the September following. His nostrils, filled with the exudation, had discharged blood several times the two previous days; and his fauces, though slightly congested, were coated with patches of membrane. There was no permanent heat of skin or general fever, but great irritability and prostration, as shown by the rapidity of the pulse and its lack

of volume. The boy was healthy, though of a scrofulous constitution, had been allowed a great deal of exercise in the open air, and was eating heartily up to the time of seizure. He had had the scarlet fever. This patient took two teaspoonfuls of brandy every second hour for five days, when quinine was added. Large plugs of the exudation, constantly forming, were discharged from the nostrils.

At this time, the beginning of the third week, no hæmorrhage had taken place for four or five days; the fauces, though the membrane had re-formed several times, were now nearly free, and the exudation in the nostrils, less in amount, was more slowly renewed. Thinking that the quinine had accomplished all it was capable of, we substituted for it the muriated tincture of iron. The membrane ceased to return in three weeks, but the other symptoms remained much as at first—the pulse above 100 per minute, soft and easily compressed; a blanched countenance, like that seen after scarlet fever; and great disposition to perspiration. There was a nasal voice, and the finger, inserted into the back of the throat and freely moved in all directions, did not cause contraction or any effort to vomit. This paralytic condition continued for four weeks after the falling of the membrane, at which time the depraved state of the blood was nearly removed. In two months and a half the patient attained his usual health, and has since suffered no relapse.

CASE XVIII.—This boy's aunt, of a similar constitution, was attacked the same day. There were no general symptoms, though the tonsils were swollen, and one had a patch of membrane upon it the size of a ten-cent piece. In three days, under the use of brandy, this condition disappeared, and all evidences of disease were removed.

CASE XIX.—On the third day of my attendance on these two patients, the younger brother, who had the Diphtheria in February, was taken with a violent inflammation of the throat, which was attended with a high fever, and a full, bounding pulse, numbering over 100 pulsations per minute. There were all the appearances of a severe attack of tonsillitis—the mucous membrane of a bright, florid color and covered with a secretion of mucus, which was abundant and yellow, but stringy and tenacious.

On the second day, the secretion in the fauces became more plastic, adhering together firmly, and resembling the albuminous product observed in uterine catarrh, though still intermixed with the ordinary mucus. For this reason, it was now deemed proper to discontinue antiphlogistic medication, and for fear that Diphtheria was in a state of incubation, resort to brandy and quinine. For the following three days there was a subsidence of the fever and inflammation, and a change from an albuminous to a mucous secretion; so completely, that I questioned the tendency to the formation of a membrane, and concluded to omit the brandy and quinine and give a

laxative; which, as the bowels had not been moved for five days, seemed to be demanded. The cathartic operated very freely several times. On the following day the evidences of Diphtheria were unmistakable—greater congestion of the fauces than ever before, and a membranous exudation, firm, adherent, and distinctly formed. There was no spontaneous hæmorrhage. The brandy and quinine were resumed, and continued to the termination of the case.

On the next day—the sixth—the symptoms were alarming—extreme prostration, colliquative perspiration, imperfect aëration of the blood and a state of semi-consciousness, from which, however, the child would arouse when spoken to; in short, every evidence of an approaching collapse, similar to what is observed in fatal cases of yellow fever or Asiatic cholera.

During the seventh day, the above symptoms were intensified—the pulse flickering and uncertain, the child unconscious to any impression, and the skin of a deep blue color, though there was no impediment to inspiration.

By my request, Dr. Mason now saw the patient, but no amount of stimulation produced any effect, and the boy died at 11, P.M., from the poisoned state of the blood.

CASE XX.—Mr. B., Fulton Avenue, 35 years of age, a baker by trade, working in a close, under-ground room, of a pale look, emaciated appearance and of a weak, delicate constitution, was taken with a sore throat Nov. 1st, 1862, and had fever, thirst and inflamed tonsils—in other words, was seemingly attacked with tonsillitis. On the second day, the mucous cryptæ were filled with a white secretion, giving the parts the appearance of follicular inflammation. On the third day, many of these white spots had coalesced; and the uvula, becoming inflamed, had a small patch of exudation on its surface. There had been epistaxis during the night; and the tonsils, disposed to bleed, were now covered with drops of blood, which exuded on forcibly depressing the tongue. The patient experienced an aggravation of symptoms from a gargle of the sulphate of zinc, which he had been using. Both this and a diaphoretic mixture were discontinued, and brandy and quinine substituted. He took, continuously, half an ounce of brandy and half a grain of quinine every second hour until there was ringing in his ears; when the latter was omitted and the stimulant alone administered. The brandy was continued in a gradually diminished dose until convalescence was established, and then iron was given to improve the quality of his blood.

Directly after commencing this course of medication, the disposition to spontaneous hæmorrhage was overcome, the congestion of the fauces abated, and the membrane, becoming thick and yellow, fell off, and was not renewed. At this time the uvula, being implicated, turned of a black color at its extremity and sloughed off. Counting from the first appearance of the membrane, it was

ten days before the fauces were free of it, and the patient, though using such bracing and sustaining remedies, was daily getting weaker and more debilitated. Now he was scarcely able to maintain the erect posture, his legs giving way from under him; and he sweat profusely, drenching the cloths whenever he slept; yet in two weeks more his usual health was regained.

CASE XXI.—A little girl, $4\frac{1}{2}$ years of age, who had uniformly enjoyed good health, and did not appear to be scrofulous, took the hæmorrhagic Diphtheria; which, attended with the usual symptoms, was promptly subdued by the use of quinine. The medicine was discontinued, contrary to orders, when, in a week's time, the disease returned as at first. The quinine was again promptly successful; and then, to guard against a relapse, it was continued in a diminished dose, in connection with wine whey, for two weeks afterward. Though more than a year has elapsed, the child has not since suffered from this disease.

CASE XXII.—During the session of 1861, a little girl, 11 years of age, presented herself at the College Clinique, brought there by her mother. Four weeks previously, she had the Diphtheria, simultaneously with three other children in the same house. All, except this one, died, and she escaped as by a miracle. The mother stated that her throat was in a frightful condition, that there was bleeding from the nose, and that, after some two weeks, these symptoms abated, when her weakness was very great, and she was both blind and deaf. After a time, the power of the arms was lost, when sight and hearing began to return. In a few days more, the legs began to be affected, at which period she was presented to my notice. The power in all of her extremities was nearly equal, though very imperfect and uncertain, hearing and sight apparently good, the countenance stupid and idiotic, and great dullness of the mind, which seemed to partake of the general lethargy. This case was treated with brandy and good food. In a few days there was a general improvement in all of the upper portions of the body; but walking was much more difficult, and well nigh impossible. The child, from this time, was not brought back for twelve days; the mother, who came to renew the prescription, stated as a reason, that, from the loss of power in her legs, it was impracticable, although there was now less weakness in the arms, and her intelligence was improving. After her return, it was nearly three weeks before she regained the perfect use of her lower limbs. Eventually, however, she was completely restored in every respect, both in mind and body, as, several months subsequently, I had the opportunity of observing. The manner of this creeping paralysis was not a little remarkable, and, still more, the torpor of the brain, which resulted, for the time being, in an abolition of two of the special senses, and probably, though the stupidity of the girl was too great to determine this point, of the others also.

CASES XXIII. and XXIV.—A year last spring two cases of Diphtheria of much interest were treated in the Out-Door Department of the Hospital. It was stated that four others occurred at the same time in the house where this family resided; all of which, affected in a similar manner, died. These two children, $3\frac{1}{2}$ and 6 years old respectively, had, markedly, depraved constitutions, and little vital stamina. They had been complaining three or four days before presenting themselves, and now the entire fauces were covered with a foetid, bloody exudation; a dark, grumous blood distilled in drops whenever they were touched; swallowing was impeded, but not remarkably troublesome; a bloody mucus was discharged from the nose; and a swelling at the angle of the jaws, and knotted, enlarged glands were seen externally. The children, pale, badly nourished and much prostrated, had a quick, irritable and rapid pulse.

The treatment employed in the above cases was put in force; yet, from the disintegrated state of the blood, convalescence was very tedious, and the membrane did not entirely disappear before the end of the fourth week. Points on the tonsils had an ulcerated appearance, and a most disgusting fœtor was exhaled with the breath. Notwithstanding the brandy and quinine were given in larger doses than ordinary, and the free use of animal broths, the nervous and muscular weakness and prostration were greater than at the outset; and, on the disappearance of the membrane, ascites and anasarca showed themselves. The dropsy was treated by a continuation of the same remedies; and, gradually, as digestion, assimilation and nutrition were reëstablished, the water disappeared. Eventually, after a treatment of six weeks, both children were cured, and, to our knowledge, have not relapsed. It should be mentioned, that the muriated tincture of iron was given in place of the quinine for a portion of the time during convalescence.

CASES XXV. and XXVI.—In February, Dr. M. invited me to see an infant, 16 months old, in a family, in which a child the day previous had died after an illness of thirty-six hours. This child was nearly three years of age, and, laboring under symptoms like to those now shown by the infant, died with marked evidences of blood-poisoning; although no membrane could be detected in the throat, and none, as was evident from the respiration, obstructed the air-passages. I found that the infant, only taken sick the day previous, was in a state of collapse, and had the symptoms of impending dissolution—a feeble, uncertain pulse, moaning, restlessness, jactitation, and a livid, blue color of the surface;—yet, as in the other case, there was no evidence of the existence of a membrane, since none could be seen, and inspiration was not impeded. The child died during the night. Unfortunately, in neither case could an autopsy be obtained.

CASE XXVII.—The parents had one other child, a boy 6 years of age, who, for a week, suffering from a croupy cough, loss of voice

and stridulous inspiration, was now, frequently, seized with suffocative paroxysms of great severity. He had been treated with antimony and ipecac, in nauseating and emetic doses. I suggested the administration of brandy and quinine, and in a week the lad was well, excepting a slight bronchitis that soon disappeared.

My conclusion is, that these three children had the Diphtheria, that the two younger died from the poisoned state of the blood before the membrane showed itself; and that the recovery of the elder by the above remedies, shows not only the nature of his disease but that of the others.

CASES XXVIII. to XXXIV.—Within the last six months seven other cases of Diphtheria invading the larynx have fallen under my notice. One of these, a boy between 6 and 7 years of age, operated upon by my colleague Dr. Gilfillan, eventually recovered under the use of quinine and stimulants. Of the other six, under medical treatment alone, one failed too rapidly for any treatment to be of much avail; but the others, two of whom recovered, gave to this plan of treatment a fair trial.

CASE XXXV.—In August last, Mrs. R., 40 years of age, of a delicate constitution, was attacked with a swelling of several of the large joints simultaneously. There was great debility, a high fever, and a very rapid pulse. Under the use of colchicum, this seemingly arthritic rheumatism disappeared in three days; when, on the following morning, patches, appearing to be membranous, were discovered on the inside of the cheeks and on the tongue. Eventually these patches were developed into a membrane, which, covering the mouth, extended into the fauces. This membrane fell in seven days and was not renewed; upon which the swelling of the joints returned as severely as at first. In addition, there were severe neuralgic pains shooting down the main nervous trunks, and a profuse, drenching perspiration. As, in ten or twelve days, the rheumatism was got the better of, the want of muscular power was very observable; from this condition, however, she rapidly recovered, and has since continued in the enjoyment of good health. The treatment consisted, on the appearance of Diphtheria, of brandy and quinine; but after the first three days the stimulant was alone given, excepting when the membrane had about disappeared I gave her for 24 hours the tartrate of potassa and soda, which renewed the membrane in the mouth and made the patient worse.

CASE XXXVI.—Mrs C., æt. 30, spare, anæmic and greatly debilitated from nursing, was taken with the Diphtheria Jan. 1st, 1863. On the evening of the 4th, one tonsil, which had suppurated, discharged a large amount of pus. The following day there was paralysis of all her limbs, which were racked with violent neuralgic pain, shooting down the main nervous trunks. In several places on her arms and legs erythematic spots appeared, but did not remain more than thirty-six hours. On the 6th, the right arm and left leg were

free of pain and could be moved in all directions; but as yet the power in the muscles was feeble. On the 7th a like change, in her left arm and right leg, took place suddenly; an impression came over her that she could move them, and instantly the muscles obeyed her will. On the next day the patient could stand; on the second could walk, from which time recovery was rapid. She took from the first the following prescription. *R.* Cinchonix sulph., gr. xxv.; acidi sulph. a., q. s.; aquæ font., f ʒ iij. *M.* S. A teaspoonful every second hour, with half an ounce of whiskey. On the 8th the cinchonia was omitted, but the stimulant was continued in the same dose every third hour.

CASE XXXVII.—In July last, a soldier from Gen. McClellan's Army of the Peninsula was, with 123 others, admitted into the hospital. He had been sick for some weeks with the typhoid fever, from which having recovered, he now suffered from debility and a depraved condition of the blood. In the first week of August he was attacked with the Diphtheria; and, in six days, under the use of cinchonia and whiskey in doses similar to the last case, the engorgement of the throat abated, the membrane began to fall, and convalescence was commencing; when, on my leaving the city for ten days, this treatment was interrupted, and one by the chlorate of potash substituted. The diphtheritic symptoms gradually resumed their former severity; and, the second day before my return, he drank at a draught half a pint of a solution containing two drachms of the potash, which was designed to be used in the twenty-four hours. The next morning gastric symptoms showed themselves, which, when I saw the man, indicated violent gastritis—hardness, tenseness and acute tenderness over the stomach, and a rejection of all food or medicine. The matters vomited consisted of ropy mucus, streaked, at times, with blood. The fauces were in the same condition as in the beginning, but there was much greater difficulty in swallowing.

It was more than two weeks before the inflammation of the stomach was subdued; and then the paralysis of the fauces, which had gradually been getting more decided, was almost complete, rendering the swallowing, more especially of fluids, nearly impracticable. In a few days there was a loss of taste and smell, and directly, in the face and upper portion of the chest, a want of feeling which gradually crept down the trunk and arms, and was followed by a lessened power in the muscles. Taste, smell and the power of swallowing were much improved in a couple of weeks, when the arms became powerless and the same numbness passed down to the lower parts of the body. In a short period all the extremities, with the spinal muscles, were paralyzed, rendering him perfectly helpless. A severe pain in the right ear was followed by total deafness on that side. His sight became imperfect—all objects were indistinct and surrounded by a haze, and small ones, intently looked at for a moment,

were blurred and run together. He was presbyopic, as was shown by his ability to tell large letters held far from him, which he could not make out at the ordinary distance. Such was his condition in the middle of October. By the 1st of November he had regained the special senses in perfection, and also the power in the spinal muscles and those of the arm, but not of the forearm. Now for a month his condition remained without improvement, though nutrients, cinchonia and whiskey, which had been constantly given since there was an ability to swallow, were still assiduously administered. Now all medicine except the pyrophosphate of iron was omitted, and this was used in four-grain doses three times a day. It had the most happy and prompt effect—the power of motion returning in the parts first paralyzed, and last of all in the toes. When he began to sit up, which was before there was any improvement in the legs, there was great muscular weakness observed in the heart, rendering the recumbent posture necessary as a matter of prudence. When he had recovered sufficiently to stand, this feebleness of the heart's action was overcome. In four weeks after commencing the use of the pyrophosphate of iron he was able to walk when supported, in five could do so without assistance, and in six the recovery from paralysis was complete.

CASE XXXVIII.—Mrs. S., an English lady, 48 years of age, the mother of five children, enjoyed good health until one of her pregnancies, twenty years since, when she was attacked with inflammation of the bowels, which resulted in the premature birth of a dead child at the eighth month. Her last two children reached the full time, but were stillborn, as she thought, from the length and severity of the labor. Her illness, greatly aggravated by these two confinements, the last of which was nine years since, increased in severity; until, eventually, her sufferings became so great, that for long periods at a time she was bed-ridden, and obliged habitually, for five years, to take laudanum to quell her pains.

Her symptoms, from first to last, presented little variation, except in their severity. These were an obstinate constipation, tenderness, hardness and distension of the bowels, great soreness, and a feeling of constriction in the rectum, which was increased by alvine movements, and a sense of dragging, forcing downward and tension, extending from the back, over the hips and down the outlet of the pelvis. In the first stage of the disease her passages often contained a jelly-like substance, that was frequently stained with blood; and, uniformly, she was obliged to rely on cathartics or injections to relieve her bowels. The fæces were either scybalous, flat like a piece of tape, or in round, small rolls, from the size of a quill to that of the little finger.

She was under medical treatment in England for two years, without benefit. At this time, moving to New York, she became much worse; and all of her distressing symptoms reached their height.

These were pronounced to be due to ulceration of the os uteri, by a physician of note in that city, who had her under treatment for two years and four months. From the obstinacy of the case, another practitioner was called in counsel; when, from the failure of gentler means, it was determined to resort to the hot iron. After its employment for a lengthened period, the uterine disease was stated to be nearly cured, only requiring one or two more applications; although her symptoms remained unchanged, and there was no relief from her sufferings. Accidentally observing a hollow, tube-like substance in one of her passages, she showed it to her physicians; who, on examination by the microscope, told her that it was like the membrane formed in croup. Upon this discovery, uterine applications were discontinued, and, for the first time, attention directed to the bowels; but, as the lady had lost confidence in her medical advisers, their services were dispensed with, and another physician called in. He attended her for a year, and gave a variety of drugs, without much relief following, excepting from injections of the nitrate of silver. By their use the membrane would come away, and transient comfort be attained, that continued until another was formed. This membrane was sometimes in shreds and filaments, resembling long, slender worms, sometimes broken up into a great number of pieces, sometimes rolled up in a ball, and sometimes in hollow tubes—a cast of the intestine—frequently twelve inches in length.

She now visited England, and, by the voyage, was cured of this disease. During her stay there for four months, and for the first six months after her return, she remained well, and was consequently free of those symptoms that had hitherto followed her; but at this time—three years since—her disease returned as of old. This lady sent for me two years ago last June, not that she wished to undergo a course of medication; as, in her language, *everything had been done that could be done*, and a cure in her case was simply impossible; but for the purpose of getting directions for the use of the caustic, the formula for which she had lost. She consented, however, by a promise on my part not to aggravate her condition by the trial of harsh means, to take, first a prescription of the gum turpentine, and then one of the sulphate of copper. With both medicines a small portion of rhubarb was directed at bed-time. These remedies were of no benefit; but an injection of lunar caustic—gr. ij. to ℥ i. of water—that was used whenever her distress was greatest, gave a measure of relief, provided the membrane came away, until another was formed. A specimen of this membrane, a tube three quarters of an inch in diameter and ten inches in length, I had an opportunity of seeing.

On repeatedly and carefully investigating her history, the fact was elicited that her medical attendants, throughout her illness, had entertained the opinion that her disease—uterine or intestinal—was

inflammatory, and demanded for its cure antiphlogistics and low diet. Consequently, she had been confined within doors, much of the time in the recumbent posture, limited to light food, mostly vegetable, and directed to avoid alcoholic or other stimulants. This lowering regimen, only adapted for acute diseases, had been rigidly enforced; sufficient of itself, in so long a period, to break up the strongest constitution, since the animal frame cannot maintain its integrity unless all the elements of nutrition are supplied to the blood. Appreciating this truth as well as another—the frequent cure of chronic inflammation by stimulation—I resolved to bring the patient back to a diet—animal and vegetable—of the most nourishing character. Whilst thus supplying the proper materials of nutrition, I strove to aid digestion and assimilation by exercise in the open air, and, especially, by the use of an alcoholic stimulant. By this means I hoped to increase the crisis of the blood and the tonicity of the capillaries; when possibly the natural powers, thus invigorated, might surmount the local disease. It was extremely difficult to overcome the prejudices of the patient or dispel from her mind the terrible significance of the word, inflammation, which had been sounded in her ears for many long years—a waking horror by day, and a night-mare by night—but, eventually, on reflecting that she could be scarcely more miserable, she resolved to give this plan of treatment a fair trial. She was directed to take four table-spoonsful of brandy daily, to use the nitrate of silver injections whenever the local trouble was insupportable, and to follow a diet and cultivate habits indicated above. Disliking the brandy, she substituted Bourbon whiskey, of which she took a wineglassful during the evening. The stimulant, used in this way, had its full excitant effect, and should, according to old theories, have lashed the inflammation into a high grade of activity. Yet, strange as it may seem, the condition of the bowels rapidly improved; so much, that in a few days the injections were dispensed with and the whiskey was continued alone. Under its use her symptoms became gradually less severe; and the membrane, only occasionally appearing in shreds, finally disappeared in four months, when this peculiar condition of the bowels was seemingly overcome. The lady continued the whiskey for a month longer, during which time she constantly gained in strength and flesh; and now, supposing herself cured, she resolved to break up the habit of whiskey-drinking, as she did some years before that of taking laudanum, and discontinued the stimulant altogether. Two months subsequently, having relighted a bronchitis, to which in a chronic form she had long been subjected, she sent for me again; when I found the fauces congested and coated with the diphtheritic membrane. A table-spoonful of whiskey was given every second hour, which, without creating any noticeable stimulation, caused the membrane to disappear in six days. What was singular, on the fourth day of this attack, the membrane again appeared in the stools, and

continued to be formed for a week. The cure was rapid under the use of the stimulant, and continued for six months, at the end of which time a few shred-like pieces of membrane showed themselves again during a fresh accession of bronchial inflammation. This relapse, notwithstanding the bronchitis, which in the first instance had been relieved as her strength improved, was promptly overcome by a return to the stimulant, which she had again omitted for a period of six weeks.

At the present time this lady is free from any abdominal symptoms, or any constriction or sense of irritation in the lower bowel; has natural passages, which contain neither mucus, jelly-like matter, or membrane; has little cough or expectoration, and has improved in blood and flesh, having gained more than twenty pounds. This improvement has been constant since the use of the stimulant, and only interrupted by its discontinuance. Probably, from the long duration of the disease, this treatment will have to be followed for one or two years before Nature will be diverted from its unnatural channels and a normal nutrition established.

In concluding this article, that has been extended beyond the limits designed, I will not tire the reader with a resumé of the cases; but embody whatever deductions are derivable therefrom under the head of

THE TREATMENT OF DIPHTHERIA.

In the thirty-eight cases of Diphtheria detailed above, this alarming disease is presented in almost every varied phase. With a singular uniformity the stimulating treatment, whether in the acute or chronic stage—that of excitement, fever and inflammation, or of prostration, paralysis, rheumatism or dropsy—had the same happy effect; and it was in all conditions, that had a diphtheritic origin, uninterruptedly followed; since we only regarded the causation, not its manifestations—the root of the evil, not its offshoots—and directed our efforts to the removal of a special state of the blood. This state of the blood, which is prone to occur in scrofulous children, or adults reduced by disease or of feeble constitutions, in a certain endemic condition of the atmosphere, is marked by a diminished vital power; which being exalted by stimulants, the symptoms are checked, the inflammation subdued, the membrane removed, a rapid recovery effected and relapses prevented. In other words, this plan of medication is radical; strikes at the heart of the trouble; whereas most others, that have been proposed, are but an ineffectual warfare against symptoms. The blood, which is similarly affected in the mild or severe cases, in the first or later stages, only differing in the degree of its dissolution, alone claims our attention. Against this condition, before the disintegration is irreparable, we bring to bear the most powerful means in our hands, to buoy up the constitutional powers, and sustain the activity and energy of each function.

The first link in this morbid chain being this retrograde movement in the vitality of the blood, when this is checked, fever, inflammation, hæmorrhage, exudation, collapse, paralysis, dropsy, &c., disappear, almost magically, from the simple fact that the cause has been rendered null and inoperative, and the prime pathological change removed.

Of the remedies that have been employed in Diphtheria, two only have proved themselves in our hands worthy of confidence, with the exception, in the chronic stage, in favor of the salts of iron. These two remedies—alcohol or cinchona in one of its forms—are administered in such doses and at such intervals as to secure one effect—the fullest stimulation of the nervous and vascular systems. Either singly may suffice when the vital force needs but slight aid to maintain the integrity of the blood; but the two united have more than a double power, and call out the greatest possible amount of resistance; since the nerve centres and bloodvessels—the great life-factors—are exalted to the highest point. Alcoholic liquors, when given in such quantities and intervals, as to occasion and keep up a steady but not excessive excitation, not only quicken the functional offices of each organ, but act, more especially, on the nervous and vascular systems. They bring out the latent powers, arousing them when dormant and freeing them when oppressed by a load of morbid influences; and thus give, for the time being, the greatest energy to the entire organism. Herein, according to the views of many therapeutists, alone consists the value of this class of stimulants in any disease. The patient lives over the crisis, or the poison is spent or eliminated; and thus recovery becomes possible. This is but a partial estimate of the remedial action of alcohol; which not only produces the effects just mentioned, but others of much greater importance in the present disease—the increased vitality of the blood itself. It is well known that the habitual use of spirituous beverages augments the blood-making process, renders the blood richer in all of its important constituents—the red globules, albumen and fibrin—and of a greater crasis; by which means, there arises an excess of organizable material, that often occasions inflammatory diseases in *bonvivants*. This condition is the opposite to that existing in the diphtheritic subject; whose blood has, invariably, been rendered poor by exhausting disease, or impoverished by the demands of increase and growth, as in the instance of children. These causes are intensified and rendered operative by a scrofulous or syphilitic taint.

It is a noteworthy fact, that, in my experience, the Diphtheria never attacks those habituated to the use of spirits. This, if confirmed, may be more than a remarkable coincidence.

We, therefore, from clinical observations and therapeutical deductions, arrive at the practical conclusion, that alcohol is not only a stimulant to the system at large, but also to the blood itself, quick-

ening its vital elaborations, and increasing its vital status; through which, a direct barrier is thrown in the way of the disease. In other words, the results produced by the disease, and by the alcohol in the blood, being directly opposite, they neutralize each other; and thus, the stimulant assumes in our eyes the position of a true remedy, a trustworthy antidote. Hence its medicinal power being not only remedial, but prophylactic, will prevent the extension of Diphtheria in the other members of the family, as well as cure the one affected. This conclusion is a necessary sequence; if the pathology of Diphtheria and the *modus operandi* of alcohol have been correctly appreciated.

In malignant cases of Diphtheria, we might desire to avail ourselves of a co-operating remedy; of one, like quinia, that particularly excites the great ganglionic nervous centres; by which means, we should attain a maximum of power, and carry stimulation to the highest possible degree. The various preparations of the cinchona bark fulfil this indication; and, when pushed to the extent of causing tinnitus aurium, are our most potent nerve-stimulants. Their efficacy is shown in all diseases when the innervation is weakened, disordered or perverted; in fevers from malaria, in fevers from a blood-poison, and in a variety of morbid conditions attended with an exhausted or defective nervous energy. As a tenderness of the gums is a mark of the saturation of the system with a mercurial, so the ringing in the ears indicates that the brain is fully under the influence of cinchona. Both it and the alcoholic stimulant, whether used singly or united, should be given with regularity and in sufficient doses to obtain their full effects; and then the latter, in a lessened quantity, continued for two or more weeks after the disappearance of the disease and its sequelæ. From the outset to a permanent restoration to health, one, or perhaps both, of these remedies are to be continuously administered.

In the more tedious cases, that retain a hæmorrhagic tendency, the substitution of a sesqui-salt of iron for the cinchona might, for a time, be advisable, when the peculiar effect of the latter on the brain had been attained. These salts of iron, like the alcohol, increase the crasis and coagulability of the blood, as I have experienced in several instances of internal hæmorrhage; but they affect the body of the blood too slowly to be a trustworthy reliance in acute cases. Their action would be slight short of two or three days; whereas the progress of Diphtheria brooks no delay. Indeed, one of my cases was attacked with the disease, although the persulphate of iron, in free doses, had been in use for hæmoptysis for more than forty-eight hours. At least fifteen drops of the muriated tincture, or five drops of the solution of the chloride or persulphate of iron, should be administered every third or fourth hour whenever we desire this peculiar change in the blood; but in chronic cases, with more time at our disposal, the dose may be less; since, usually, our main object is now to remedy the anæmia.

Most writers insist strongly on the importance of giving large quantities of animal broths to sustain the strength of the patient, and thus enable him to ride out the violence of the disorder. This, as a medicinal means, cannot but be erroneous in the early stages; since most of the patients are taken while eating heartily of animal food, and enjoying their usual health. We could not expect that nourishment, however concentrated, which did not prevent the accession of a disease, whilst the digestion was vigorous, can cure it when digestion, assimilation and nutrition are completely destroyed. The change of our food into the living structures is something more than its ingestion into the stomach or its absorption into the blood-vessels; and nutriment, unappropriated, can be but an incumbrance—a foreign element—which will be carried off by the kidneys with the effete matters. Most of my patients took little or no nourishment before convalescing, when it was directed for the same reasons that we order it in other ailments.

It is important to avoid close, hot, and badly-ventilated rooms, and secure a free circulation of air. As soon as practicable the patient should be taken out of doors, and no fear need be entertained of *catching cold*; the disease having no analogy with tonsillitis, pharyngitis or any other mucous inflammation whatsoever.

At the present time, the chlorate of potash seems to be the favorite of the hour; but it has, probably, no greater claims to our regard or any more solid foundation for its character as a *specific*, than iodine or cod-liver oil in the height of their fashion; when it was presumed that tubercles would be absorbed, cavities closed, and, in fine, phthisis cured by the marvellous efficacy of these remedies. Theory was the only foundation on which such expectations were based; as it is, for the eulogiums lavished on this new wonder by its advocates. They, observing that the blood, removed from its vessels, is reddened when this salt is added, conclude straightway that we can, by its use as a medicine, supply a lack of substance in the lungs; that its elements being set free in the circulation, the oxygen of the salt will not only fill the place of that which should have been received from the inspired air, but by its excess act as a stimulant, as is observed when this gas is inhaled; and that the chlorine, by its antiseptic properties, will purify the blood, and thus the *materies morbi* will be neutralized.

My observations teach me that the chlorate of potash is perfectly unreliable in Diphtheria; and, I am not sure its employment may not be injurious; certainly its irritation when gargled does harm, and if, when received into the blood it is decomposed, the free alkali will act as a liquefacient, by which means the crasis of the blood will be lessened, and the disease increased. All liquefacients, such as alkalies, mercurials, iodine, &c., are contra-indicated in a dyscrasia, like that of Diphtheria, since their effects coincide with that of the disease; thus rendering the death of the patient, in all severe

cases, more imminent. From experiments made by myself recently, however, it is more than doubtful whether any decomposition of the chlorate of potash takes place in the blood. I had under my care a young man, 21 years of age, who had had the morbus cæruleus from birth. The surface of the body was of a purple color, from the faulty aëration of the blood. I gave him 3 ij. of the chlorate of potash in the twenty-four hours on three different occasions; but at each trial, after continuing the salt two or three days, it had to be discontinued from the irritation set up in the stomach and bowels. The blood was not reddened in the slightest degree, a fact brought to the attention of several medical gentlemen; but the urine was very largely increased, amounting to more than twice the normal quantity, and had a specific gravity averaging about 1010, and an acid reaction. The alkaline salts—those formed by vegetable acids for instance—that are known to be decomposed in the blood, are eliminated from the kidneys as carbonates; and were this the fact in the case of the chlorate, the urine would be alkaline. Since this experiment I have tried the chlorate of potash in the Clinic, where its diuretic action in most of the cases was equally well marked.

Hence we infer that the theory of the *modus operandi* of this salt has no real basis; and that, as far as we know, its efficacy lies solely in its stimulating the urinary secretion. It is an irritant, whether in the stomach or blood, and thus stimulates the functional activity of the organs it comes in contact with; but in a free dose this irritant quality produces inflammation; as happened in one of the cases related, in which two drachms of the salt caused violent gastritis. On two occasions I have known an ounce of the chlorate of potash taken in twenty-four hours, although in dilute solution, to occasion severe and protracted vomiting.

It is proper that a reason should be given for the use of the sulphate of cinchonia in the later cases. For the past sixteen months I have employed this salt, in public and private practice, to the amount of several ounces, and attained results warranting the opinion, that it, equally with quinia, merits our confidence. In all cases demanding a nerve-tonic, even in intermittent fever, I have found the cinchonia not inferior to the quinia; and in three cases, in which the paroxysms returned one or more times after the use of the latter, the former was permanently successful. All practical physicians are aware of the frequent relapses in miasmatic fevers, unless at intervals, by renewals of the medicine, its peculiar impression on the nerve-centres is perpetuated; and also, it is well known, that, after several recurrences of the disease, the quinia wears itself out; and then we are obliged to resort to arsenic or some other antipe-riodic. The high expectations we had indulged in, regarding its specific qualities, are not realized; and perhaps the measure of our success falls short of that which attended the profession before che-

mistry discovered the active principles of the bark. In taking one constituent to the exclusion of the others, we incur the danger of lessening the efficacy of the medicine; and, it may be, discard those that would not only heighten its power, but prevent relapses by eliminating the *materies morbi*.

I have treated more than twenty cases of fever and ague with the sulphate of cinchonia, and find that ten or fifteen grains are sufficient to break the paroxysms. Its use was permanently successful in every instance, and relapses were infrequent, although designedly the medicine was not long continued or renewed. The cinchonia does not, even where twenty grains are given in the twenty-four hours for several days in succession, stimulate the brain, cause fullness, pain or tension in the head, or noises in the ears like quinia. In two cases there was slight tinnitus aurium, in one presbyopia, and in some a large increase of urine. Our experiments seem to show, that the impression of this salt on the nervous system is different from that of quinia; and that, having equal potency to subdue the paroxysms of an intermittent disease, it may, possibly, in addition, possess a property to prevent their return by elimination or otherwise. Probably the union of both salts in a prescription would be more efficient than either singly. The bark in substance, were it not for its bulk, would be preferable to any of its preparations; since thus we should administer all of its constituents in their natural combinations. The fluid extract, however, is all that could be desired; and, containing the virtues of cinchonia in a concentrated form as they existed in the bark, is, beyond a doubt, the most reliable.

In this JOURNAL for February, 1862, I had the honor to direct the attention of the profession to the pyrophosphate of iron, and to recommend it as a nerve-tonic; capable, by the phosphoric acid set free in the blood, of increasing the nutrition of the nerve-centres, and thus radically curing diseases arising from defects of innervation. Later experience has more than confirmed my expectations. The chronic forms of paralysis following Diphtheria will be promptly amenable to the power of this remedy; which, as it adds a natural element to the nerve-centres, will be a stimulus more friendly than strychnia; that, acting only as an excitant, merely calls out the latent nervous influence.

It only remains for me to say a few words on the local treatment. This is of little efficacy; and should, in our opinion, be limited to demulcent drinks. Of the many external appliances, leeches, which are exhausting, and poultices or fomentations, which invite the blood to the point of their application, are among the most objectionable; but all, of whatever kind, are useless, if not prejudicial. All irritating, astringent or stimulating gargles increase the inflammation of the fauces, and thus afford a nidus favorable for the effusion of the membrane; but of the many kinds of local medication calculated to spread the membrane and extend it into the rima glottidis, none could have

been devised more singularly appropriate than the various caustic substances in use, which not only augment the congestion already existing, but destroy the epithelium of the unaffected parts; and then, frequently, the membrane takes its place, for the same reason that it appears on the derma where the cuticle has been detached. This, the most simple of all facts, seems never to have attracted any physician's attention. In one of my cases the membrane, two hours after an application of the tincture of iodine, was found extended over two thirds of the posterior surface of the pharynx.

In cases where the larynx is not sufficiently implicated to interfere in a serious degree with the aëration of the blood, the general treatment is still to be relied upon as offering the best chance to the patient; but, when at each inspiration there is a forced, though ineffectual, effort to expand the chest, and the skin has a purple tinge, tracheotomy, as a last hope, should be performed in patients over two years of age; whenever, other things being favorable, the exudation is thought not to extend into the trachea. Warranted as I am in the expectation that the membrane will not spread after the free use of stimulants for thirty-six hours, I should, in disregard of the statistics of the operation in which the after-treatment was faulty, still hope that in a few cases a cure might thus be effected. Under any course of medication the disease might not pass down the trachea for one or two days; but by the use of stimulants its progress may, possibly, be limited to the larynx, whence the membrane would be detached and removed, as it is seen to be, from the fauces, whilst respiration in the meantime through the artificial opening was going on beneath the seat of the exudation. Every care should be taken to prevent the supervention of inflammation of the bronchial mucous membrane by having a moist, warm air surrounding the patient, by omitting any local applications through the tube, and by not attempting to bring up mucus or membrane on swabs or other contrivances that sometimes for this purpose are thrust into the trachea; since the exudation will be almost surely formed the moment the mucous membrane is inflamed.

From the extreme difficulty of regulating the air of the room, I would suggest the idea whether by some arrangement to the front of the neck or the outer mouth of the tube, after the plan of the respirators formerly in use, it might not be possible to secure constantly a warm, moist air, such as is always furnished to the lungs by its passage through the nostrils, and thus a greater success in the operation be realized.

